



Impact of Prosumers and their Clusters on the Energy System

Larma, Marijana; Heller, Alfred; Pedersen, Allan Schrøder

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Larma, M., Heller, A., & Pedersen, A. S. (2017). *Impact of Prosumers and their Clusters on the Energy System*. Poster session presented at Fourth General CITIES Consortium Meeting, Aarhus, Denmark.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

IMPACT OF PROSUMERS AND THEIR CLUSTERS ON THE ENERGY SYSTEM

Larma, Marijana*1, Heller, Alfred1, Pedersen, Allan Schrøder2

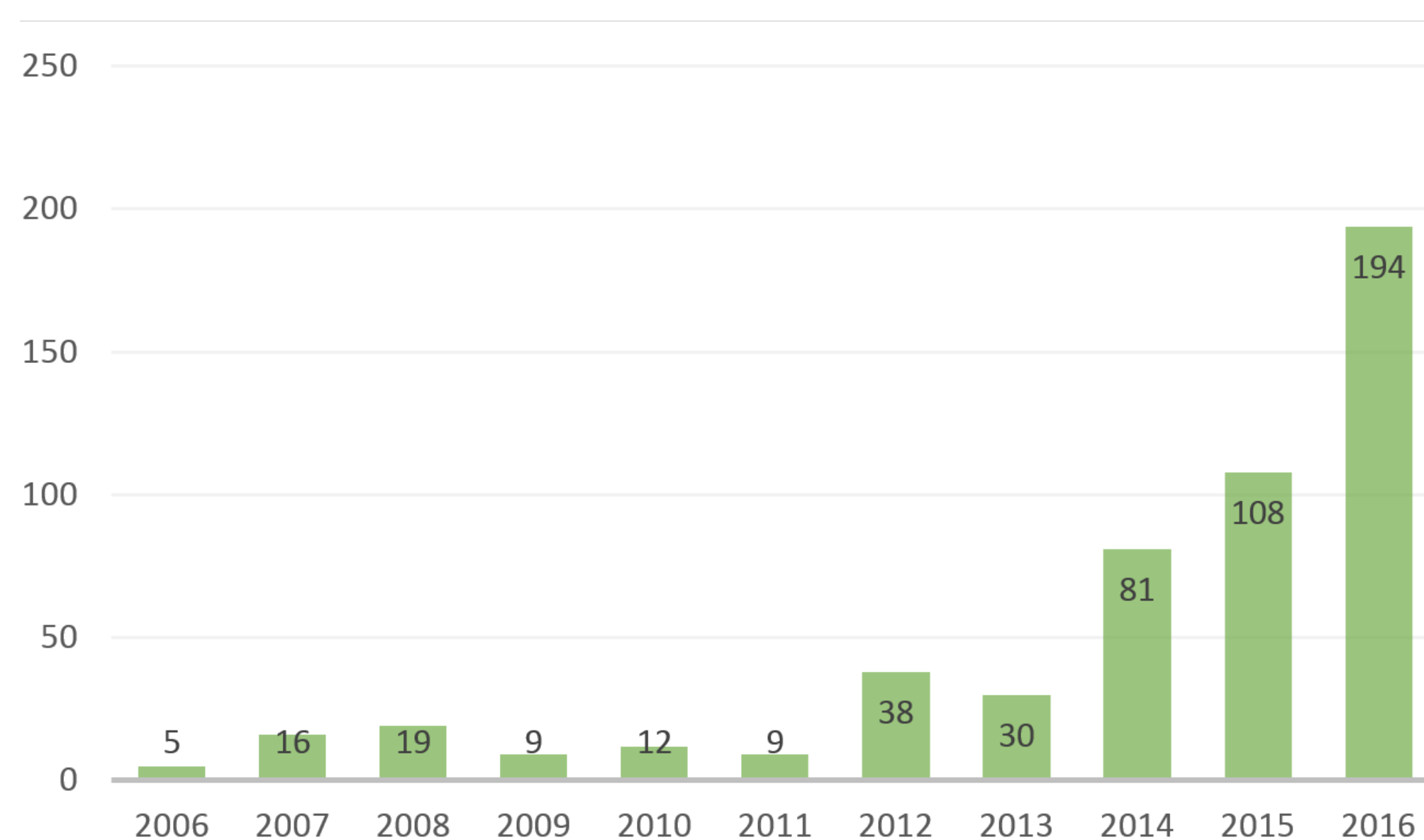
1: DTU Civil Engineering, 2: DTU Energy *marila@byg.dtu.dk

MOTIVATION

With the global and national policies for the reduction of greenhouse gas emission, increasing capacities of renewable sources are being installed. As those are becoming profitable, small actors in the market are becoming more important, changing the paradigm of the centralized, top-down operation [1] and calling for new business models and operation logic appropriate for prosumers [2, 3].

Prosuming buildings - produce and consume energy (renewable energy from PV, solar heat, wind)
- store energy by local means

- Growing number and influence
- Economic benefits of bidirectional connection [5]
- Benefits of cooperation within the prosumer group and with the energy system [6,7]

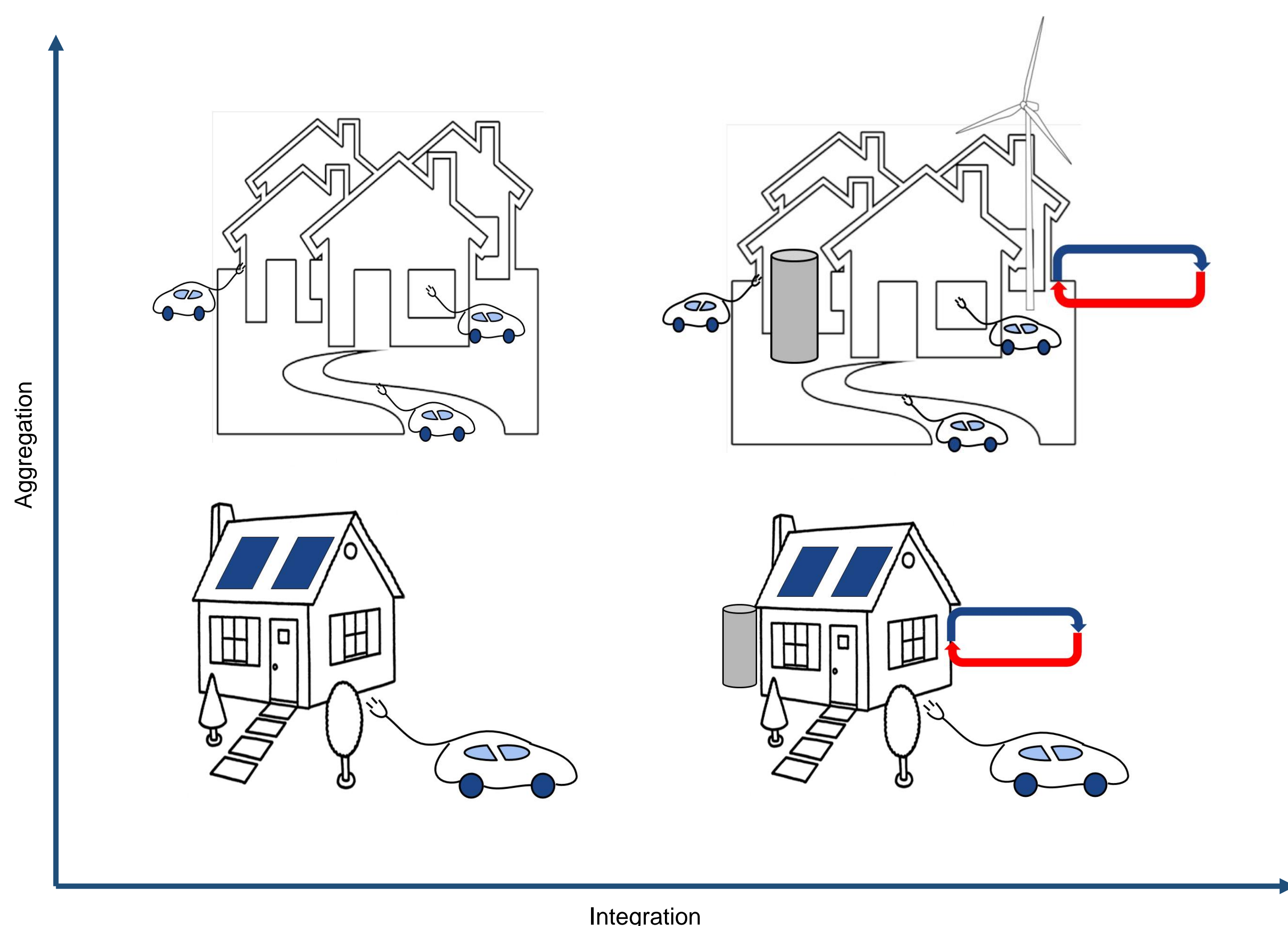


Number of articles that contain keywords "prosumer" and "energy" on Science Direct by publication year

OBJECTIVE

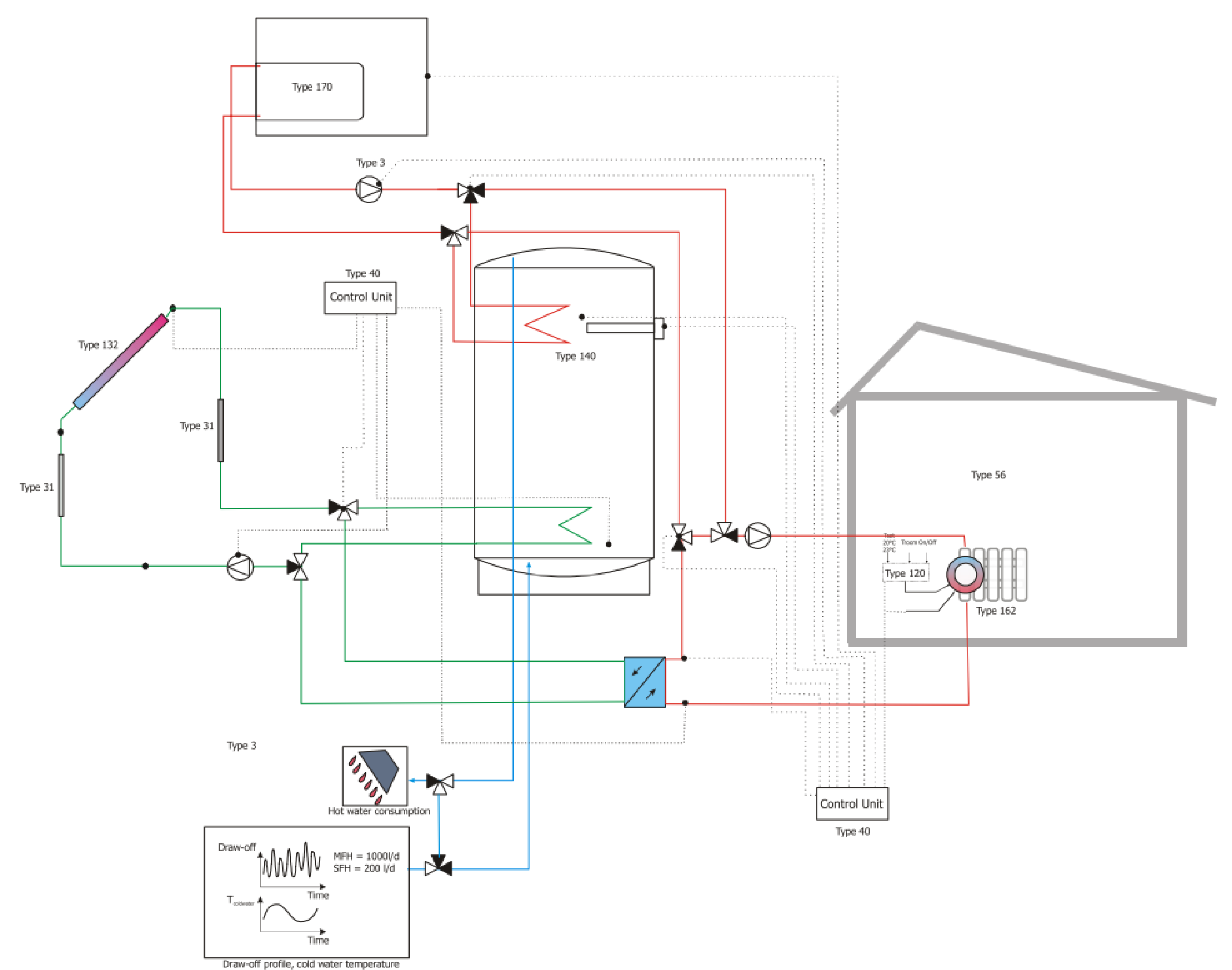
- model future prosumers – individually and at the aggregation level, where buildings play a central role with respect to future smart grids for electricity, gas, heating and cooling [4]
- Section for Building Energy at DTU Byg
- CITIES Work Package 3

METHODOLOGY

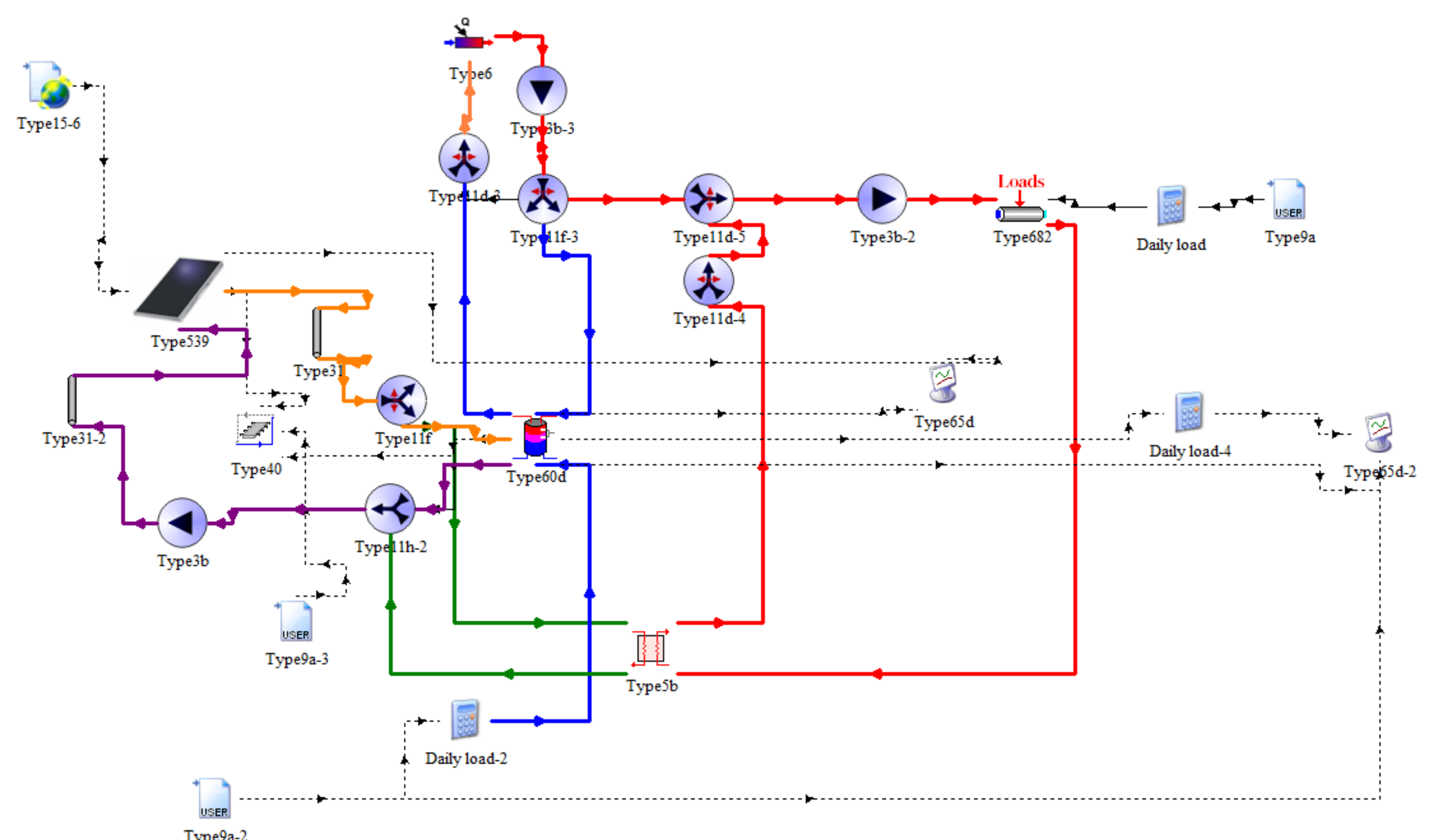


OPTIMIZATION STUDY (IN PROGRESS)

- Influence of pricing policies on optimal set-up of rooftop PV and solar collector system (net-metering and feed-in tariffs)
- TRNSYS model of PV and solar collector system
- Optimal sizing with respect to space constraints with GenOpt
- Sensitivity analysis - influence of grid context (tariff and metering policies), appliances using DHW
- CITIES Data for single-family home



Schematic illustration of the typical Danish solar domestic hotwater and auxiliary space heating combisystem [5]



TRNSYS model of the solar collector system

REFERENCES

- [1] D. J. Vergados, et. al, "Prosumer clustering into virtual microgrids for cost reduction in renewable energy trading markets," *Sustain. Energy, Grids Networks*, vol. 7, pp. 90–103, 2016.
- [2] R. Schleicher-Tappeser, "How renewables will change electricity markets in the next five years," *Energy Policy*, vol. 48, pp. 64–75, 2012.
- [3] J. Rodríguez-Molina, et. al, "Business models in the smart grid: Challenges, opportunities and proposals for prosumer profitability," *Energies*, 2014.
- [4] vacancy announcement "PhD scholarship in CITIES for IT-Intelligent Energy Systems for Cities" <http://www.dtu.dk/>, 2016
- [5] K. Ellehaug, "A Solar Combisystem based on a Heat Exchanger between the Collector Loop and Space-heating Loop (IEA Task 26 generic system #2), 2003.